# EDITORIAL

## TO FRESHMEN

Every year as the new bunch of Freshmen come into the Engineering College they begin to say that they came to college to learn the technique of some branch of engineering but that they are not getting any. To which the older ones reply, "Be patient." The time will come when you will covet the fundamental training that you are getting now and appreciate the value of it much more keenly than you do at present. Have no question in your mind on this point: You *will* get all the real technical work you can stand. After the first year the scope of an engineer's education is focused to a fairly fine point. That, you say, is just what you want; just the thing you came to school to get. All right, they have it here for you; you will soon be buried deep in it, and that is the time when a little relief from the monotony will impress its value upon you. For however great our interest in our chosen line, the same thing continuously, with little respite, is monotonous. You may think it heresy to say that engineering is not the most important thing to every one of you. Well, it isn't, nor is it to anybody else. Other more fundamental things come first, things as vitally important three thousand years ago as they are now. Things like character, for instance. Those are the things you will have to look after yourself; the real job is in your hands now, every minute of the day. If you want to be an engineer you owe the world a pretty good piece of work. And don't forget that no keenness of mind or highly developed genius counts when measured against any of these other things.

## THE ENGINEER

It is the ambition of every member of the ENGINEER staff to give our patrons the very best magazine we can. We want to please you. We want you to feel that you are getting a lot more out of it than the price you pay for it. It is your magazine, not ours. So don't be backward about telling us what you think of it. We welcome suggestions; we can bear criticism, and probably deserve it; we can take a little praise without embarrassment if you feel so inclined. If you should offer an idea and it is not used, do not feel that it was torn up and discarded; for we read them all, and discuss them, and take or reject them as our experience dictates. Imagine yourself feeding a giant whom you wanted to please, and who merely ate everything you gave him with no comment as to how it went down. You might not change the diet any if he did say something, but just the same you would like to hear what he thought of it. That's our position, and while we have a lot of visits from students with ideas, we want more and then some more, so the ideas we get will be as representative as possible. We will do the very best we can, with your help we can do even better than that.

## FRESHMAN—YOUR SCHEDULE

A freshman's schedule has on it one item that he looks upon as superfluous. That is English. But it is really in many important respects the most important. You might as well be totally illiterate as to be able to read and write, *after a fashion.* Nothing hurts you worse than a little of ignorance of proper usage. Perhaps this is wrong and a man should be appreciated for what he can do in the way of service rather than for these finer points. Wrong or right, it is the way it is done. You will have to abide by it. You can get your money's worth from that course, or—nothing. Don't be one of those who later wish they had.

## AND THE FIRST OF THESE IS READING

We wonder with customary editorial seriousness, just what the attitude of the average engineer is towards literature. We wonder just how much time you slide rule artists have for relaxation,—how much, along with B.t.u.'s, amperes, contours, and combining weights, you really care about dreaming. How many of you can inwardly boast of having a good imagination? If you cannot we wonder if you really belong in this engineering game, the one profession in the whole catalog in which the creative, the building, instinct deserves first place. And if you do have this imagination we wonder if you wouldn't enjoy reading good books the way we've grown too lately. So many engineers go thru college without reading anything but Boyd's Mechanics and a couple of handbooks. We wonder if it's because they don't know what to read, or where to find it. In any case, we call your attention to "The Bookshelf Speaks," a new department which, in its feeble way, will endeavor to help you find interesting and worthwhile things to read.

Don't keep your nose so close to the painting that you can't see the picture!

## NOW, WHO'S AN ENGINEER?

Perhaps we, who would arrogate to ourselves the right to use the title "engineer," had better look to see if our claim can be substantiated.

We like to feel that, because we are technical men, we alone are properly described by the term "engineer," with such modifications as we, and we only, think appropriate as, for instance, civil, mechanical, electrical, sanitary, and a few others.

And so the editor takes a poke at all those other upstarts who dare to style themselves "clothes-pressing engineers," "shoe-shining engineers," or "what-not engineers."

Yet, like the rest of us, this same editor is a technical man and, if asked to define a term and prove the authority for his definition, would undoubtedly refer to the dictionary, than which there can be no higher authority.

And here's what my dictionary, a 1924 model of Webster's New International, says:

"*Engineer* (n)—One who carries through an enterprise by skillful or artful contrivance; an efficient manager.

"*Engineer* (v.t.)—To use contrivance and effort for; to guide the course of; to manage; as, to *engineer* a bill through Congress.

"*Engineering* (n)—Maneuvering; contriving."

If I remember correctly, I have heard of a Tony, the bootblack, who was such an efficient manager that he amassed a million dollars. Some engineer, even if he never claimed the title.

Political engineering is suggested by the second definition above. While few of them might be able to show diplomas, there must be a sufficient number of men who are qualified by experience or achievements right now to organize the Am. Soc. P. E.

And, if you knew some plumbers as well as I do, you'd have to admit that their work was well within the limits of the third definition.

You might withhold the "sanitary," but you couldn't help calling it engineering.

Oh for a name that we can copyright and keep to ourselves!

The dictionary, of course, does not make the language; it merely records usage.—*Engineering News-Record.*

## THE ELECTRON A BRIDGE BETWEEN PHYSICS AND CHEMISTRY

Under the sustained attacks of the physicists the atom is gradually opening up, and chemistry and physics, so long separated but recognized as being fundamentally closely related, are now rapidly merging into one great science. The chemists have long demanded an explanation, on the basis of physical laws, of chemical affinities and neutralities, of the conspicuous family groupings of the elements in the Mendelejeff table, and of a vast variety of orderly molecular phenomena, pointing to some form of regularly organized sub-atomic structure. The physicists, so long occupied with and restricted to the study of the behavior of matter in bulk, are now meeting the demand of the chemists, with a great flood of light on the structure of the atom, which bids fair to explain chemical combinations on the basis of physical laws. The first and most important step was the discovery of the electron and its presence in all forms of matter. The atoms of different elements are known to contain different numbers of electrons, and the greatest further discoveries have come through study of the behavior of the positively charged atom after the abstraction of one or more electrons, as in the positive rays in vacuum tubes, and of the X-ray spectra of different substances.

One great fundamental question is as to the law by which the electrons in the atom are in equilibrium with the positive core or nucleus which makes up practically the entire mass of the atom. The most obvious assumption is that the centrifugal forces of electrons, rotating in orbits, are just balanced by the electrostatic attractions between electrons and the positive center of the atom. This simple hypothesis, while attractive as providing explanation of many of the phenomena of electro-magnetic radiation, has been found to lead to many conclusions quite inconsistent with the facts of observation.

According to Sir. J. J. Thomson, discoverer of the electron, the inverse-square law cannot account for the equlibrium of the atom, and he proposes a law under which the electrons and the positive nucleus attract beyond a certain distance of separation but repel each other for smaller distances. Applying this law to atoms of increasing numbers of electrons and their positive centers, the conditions of most stable equilibrium are found to call for successive zones of increasing diameters, of eight electrons each. Atoms with even multiples of eight electrons are very stable and chemically inactive. When the number of electrons is not a simple multiple of eight, the odd electrons are in the outer ring, and they are in various degrees of unstable equilibrium, and more easily detached, and are therefore liable to pass to another atom or attract other electrons, depending on the resulting energy changes. Thus chemical action is a matter of the readjustment of the unstable rings of electrons of two atoms to a more stable combination.

In his recent Franklin Institute lectures Sir Joseph reviews a remarkable series of chemical phenomena which may be accounted for on this theory and describes others heretofore unknown, though predicted by the theory, which have been found to be true by suitable experiment. A beginning only has been made; there are still many difficulties, and there are other theories of the atom, but it appears certain that the whole great field of chemical action will ultimately find a basis in the physical laws of electric forces. Will it ever be possible to go deeper still and explain the forces themselves?

Some day some electrical engineer or electrophysicist is going to tie up a good deal of electrical practice to the electron. More and more is equipment being developed whose behavior is forecast or controlled through knowledge of the electron's own behavior and peculiarities. Surely electrical engineers who are looking ahead to the major developments of the future cannot fail to watch the present development of knowledge and experience along the lines discussed above.—*Electrical World.*

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## COMPREHENSIVE HIGHWAY PROGRAM OF PANAMA

The National Congress of Panama in 1920 authorized a comprehensive highway construction program which has been greatly accelerated by the $4,500,000 government loan successfully placed in this market in 1923. Contract was given to the Compania Construction de Panama for the Chorrera-Rio Tetita division of 55 kilometers, and to R. W. Hebard & Co. of New York for the Tetita-Anton division of 60 kilometers, which carries a large amount of heavy and difficult work including erection of 30 large steel bridges. The Araijan-Chorrera section is to be carried out jointly by the government of Panama and the Canal Zone authorities. With the completion in 1926 of the work now contracted, the Republic of Panama will have 350 kilometers of modern highway extending from the city of Panama west through the states of Panama, Cocle, Veraguas and Los Santos. The work is administered by a National Road Commission appointed by the president of the republic. R. K. West is chief engineer of the commission.—*Engineering News-Record.*

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## ELECTRICAL HAZARDS IN MINES

The use of open-type electrical equipment, which fails to safeguard against the transmission of sparks and flame to gaseous and dusty atmospheres in coal mines, constitutes a real menace to the American miner, according to the Department of the Interior. Records of the Bureau of Mines covering 26 coal mine disasters and fires due to unsafe electrical apparatus show the loss of 500 human lives in addition to great damage to property. An open-type electric coal drill used in a gaseous mine in West Virginia was the probable cause of the death of 27 miners, the Bureau points out. A half-safe type of electric coal-cutting machine used in a gaseous mine in Pennsylvania was probably the cause of the death of 36 men. An unapproved, unsafe type of flame safety lamp used in a gaseous and dusty mine in Utah was the alleged cause of the death of 171 men. All three disasters happened within the past six months, and would seem to have been avoidable if proper equipment had been used.

Electric current can cause accidents in coal mines in five general ways: By shock to persons, by igniting powder, by igniting gas, by igniting coal dust, and by setting fire to inflammable material such as timber and coal. A great many accidents from these causes are preventable if proper care is taken. Most of the accidents caused by sparks and flashes from electrical apparatus would not take place if electrical equipment tested and formally approved by the Bureau of Mines was used. So far as known, up to the present time, no disasters have been caused by sparks or flashes from equipment having the Bureau's approval.—*A. I. E. E. Journal.*